

Four New Species of the Family Zodariidae (Arachnida, Araneae) from Vietnam

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Abstract Specimens of spiders of the genus *Mallinella* Strand, 1906 (Zodariidae), obtained from Tam Dao National Park in Vinh Phu Province, northern Vietnam and from Bach Ma National Park in Thua Thien Hue Province, central Vietnam are taxonomically studied. Up to the present, only one Vietnamese species of this genus, *Mallinella klossi* (Hogg, 1922), was known from Mt. Langbian in Lam Dong Province of the southern part of this country. Four new species are recognized and described: *Mallinella nomurai* sp. nov. (male and female) and *M. vietnamensis* sp. nov. (male) from Tam Dao, *M. karubei* sp. nov. (male) and *M. thinhi* sp. nov. (female) from Bach Ma. Male palpal organ and female genitalia are observed into details and illustrated. Diagnosis for each species is given as summarized herewith: *Mallinella nomurai* seems to belong to a certain species group widely distributed in Asia and is regarded as a close relative of *M. hoosi* (Kishida, 1935) and *M. fulvipes* (Ono et Tanikawa, 1990) from southern Japan, *M. martensi* (Ono, 1983) from Mustang District, Central Nepal, and *M. nigra* (Bosmans et Hillyard, 1990) from Sulawesi, Indonesia, but is clearly distinguished from these species in details of male palpal organ, especially in the shape of median apophysis and embolus, and also in the structure of female genitalia. *Mallinella vietnamensis* resembles *M. uncinata* (Ono, 1983) described from Kaski District, Central Nepal and *M. irrorata* (Thorell, 1895) from Palon, Burma, but is easily distinguished from these by the filiform embolic division of male palp. *Mallinella karubei* is readily distinguished from all other congeners from Asia by the unique shape of median apophysis on tegulum of male palp and by having long and slender legs. *Mallinella thinhi* is closely allied to *M. hingstoni* (Brignoli, 1982) from Tibet, China and *M. shimojanai* (Ono et Tanikawa, 1990) from Iriomotejima Island, Japan in having globular spermathecae, but is distinguished from these species by the shape of epigynal plate much thinner than those of the other two species.

Key words : Taxonomy, Araneae, Zodariidae, new species, Vietnam

Introduction

Zodariid spiders of the genus *Mallinella* Strand, 1906 (defined by Jocqué, 1991; =*Storena*, Walckenaer, 1805, sensu lato, *Langbiana* Hogg, 1922, and *Suffucioides* Jézéquel, 1964) are typical forest dwellers wandering on the forest floor at night to prey upon insects. Although many species were described under this genus from Afrotropical and Oriental Regions, the existence of much more undescribed ones is estimated in surviving preserved forests zoologically unexplored.

About 50 species of the genus were described in Asia mainly from Burma (Thorell, 1887, 1895), Nepal (Ono, 1983), Indonesia (Bosmans & Hillyard, 1990), the Philippines (Barrion & Litsinger, 1995), Japan (Ono & Tanikawa, 1990) and China (Song & Kim, 1997), but only a small number was recorded from countries in Indochina Peninsula. For instance, only one Vietnamese species, *Mallinella klossi* (Hogg, 1922), has been known from Mt. Langbian, in Lam Dong Province.

Through entomological expeditions to Vietnam, 1995–2003, made by the National Science

Museum, Tokyo (NSMT), in partnership with the Institute of Ecology and Biological Resources (IEBR), Hanoi, Vietnam, many specimens of the spiders were obtained for taxonomical studies. Some papers were published based on these materials by the present author (Ono, 1997, 1999, 2000, 2002). The present paper treats a further result of the series of studies, and four new species of the zodariid genus *Mallinella* are described from Tam Dao National Park in Vinh Phu Province, northern Vietnam and from Bach Ma National Park in Thua Thien Hue Province, Central Vietnam.

Specimens used in this paper including types of the new species are for the moment preserved in the collection of the Department of Zoology, National Science Museum, Tokyo (NSMT) in the joint ownership between NSMT and IEBR. The abbreviations used herein are as follows: ALE, anterior lateral eye; AME, anterior median eye; PLE, posterior lateral eye; PME, posterior median eye.

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Descriptions of new species

Family Zodariidae

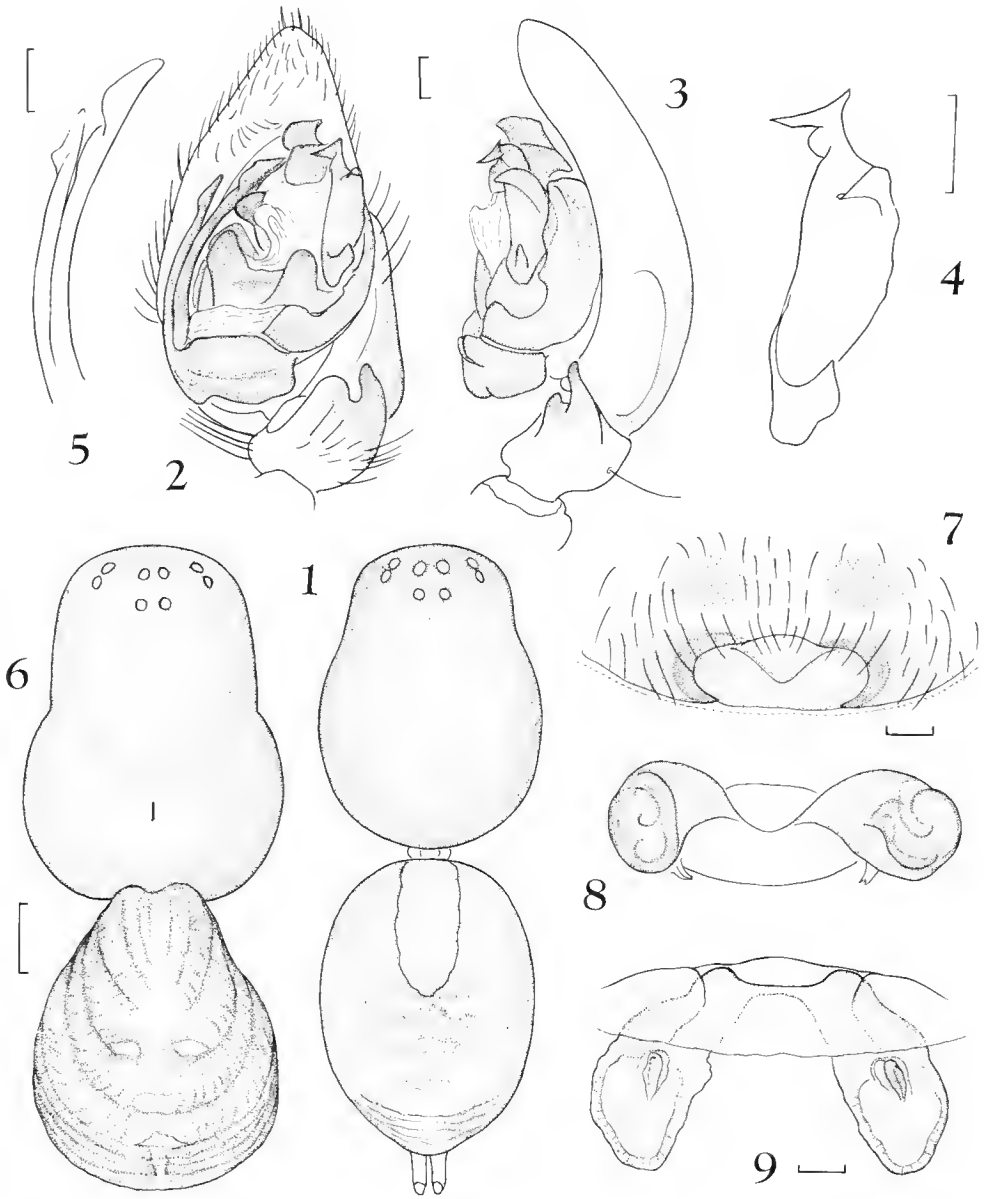
Mallinella nomurai sp. nov.

(Figs. 1–9)

Diagnosis. The male of this new species

closely resembles *Mallinella hoosi* (Kishida, 1935) from Kyushu, Japan (reported by Yaginuma, 1960, 1962, 1986, 1991, Shinkai & Takano, 1984 and Ono & Tanikawa, 1990), *M. fulvipes* (Ono et Tanikawa, 1990) from Iriomotejima Island, Japan, *M. martensi* (Ono, 1983) from Mustang District, Central Nepal (2650 m in elevation), and *M. nigra* (Bosmans et Hillyard, 1990) from Dumoga-Bone National Park, Sulawesi, Indonesia (200 m in elevation) in the structure of palpal organ, but is clearly distinguished from the above four species by the shape of median apophysis on tegulum, especially that of the tip, and by the shape of embolic division (cf. Figs. 4–5 and Ono, 1983, figs. 3–4, Ono & Tanikawa, 1990, figs. 6–7, 16–17). It may be difficult to distinguish females of these species from one another, because their genital structure is relatively simple and their spermathecae are similar in shape. However, some delicate distinctions are recognizable in the shape of epigynal plate and in the length and direction of spermathecae. The epigynal plate of the new species is thick and constricted in the middle, while that is thick but straight as in *M. hoosi* or thinner and procurved as in *M. fulvipes* (cf. Fig. 7 and Ono & Tanikawa, 1990, figs. 8 and 18; females of *M. martensi* and *M. nigra* are unknown). The white (or light-coloured) marking on opisthosoma is also different from one another: *Mallinella hoosi* has a wide band; *M. martensi* has three pairs of white spots; and the opisthosomal dorsum of *M. fulvipes* is almost black with the exception of a small white spot near spinnerets.

Besides, *Mallinella sadamotoi* (Ono et Tanikawa, 1990) from Amami-oshima Island, Japan, *M. hingstoni* (Brignoli, 1982) from Tibet, China (11000 ft. in elevation), *M. labialis* Song et Kim, 1997 from Yunnan, China, *M. dinghu* Song et Kim, 1997 from Guangdong, China, *M. nepalensis* (Ono, 1983) from Rasuwa District, Central Nepal (2000 m in elevation), *M. erratica* (Ono, 1983) from Ilam District, eastern Nepal (1600–2100 m in elevation) are also regarded as relatives of this new species. However, their males are unknown.



Figs. 1–9. *Mallinella nomurai* Ono, sp. nov.: 1–5, male holotype (NSMT-Ar 5416); 6–9, female paratype (NSMT-Ar 5417).—1, 6, Pro- and opisthosomata, dorsal view; 2, palpal organ, ventral view; 3, palpal organ, retrolateral view; 4, median apophysis, ventral view; 5, the distal part of embolic division, ventral view; 7, epigynum, ventral view; 8, female genitalia, dorsal view; 9, female genitalia, posterior view. [Scales: 1, 6, 1 mm; 2–5, 7–9, 0.2 mm.]

Type specimens. Male holotype from Tam Dao, ca. 900 m in elevation, Vinh Phu Prov., northern Vietnam, 13-V-2003, S. Nomura leg., one female paratype from the same area, 21-22-IX-1995, H. Ono leg. (IEBR and NSMT-Ar

5416-5417).

Description (based on the male holotype and on the female paratype). Measurement: Female: Body length 9.43 mm; prosoma length 5.19 mm, width 3.48 mm; opisthosoma length

4.30 mm, width 3.70 mm; lengths of legs [total length (femur+patella+tibia+metatarsus+tarsus)]: I 11.41 mm (3.04+1.26+2.59+2.59+1.93), II 10.44 mm (2.96+1.26+2.15+2.44+1.63), III 9.96 mm (2.78+1.26+2.07+2.37+1.48), IV 13.91 mm (3.70+1.33+2.81+4.07+2.00). Male: Body length 9.25 mm; prosoma length 4.72 mm, width 3.18 mm; opisthosoma length 4.44 mm, width 2.81 mm; lengths of legs [total length (femur+patella+tibia+metatarsus+tarsus)]: I 11.70 mm (3.11+1.19+2.59+2.74+2.07), II 10.44 mm (2.81+1.11+2.30+2.44+1.78), III 10.47 mm (2.74+1.22+2.07+2.81+1.63), IV 13.67 mm (3.48+1.30+2.81+4.15+1.93).

Prosoma. Carapace longer than wide (length/width female 1.49, male 1.48), with a median furrow. Eyes: both the eye rows procurved in dorsal view, $AME > ALE = PLE > PME$ (female 9:8:8:7, male 6:5:5:4 in size), $AME - AME < AME - ALE$ (female 2:3, male 5:8), $PME - PME < PME - PLE$ (female 10:19, male 8:13), clypeus very long, more than twice the width of median ocular area, median ocular area as long as wide or longer than wide (length/width female 1.20, male 1.00), slightly wider in front than behind (anterior width/posterior width female 1.00, male 1.07). Labium longer than wide (length/width female 1.06, male 1.11), sternum haired, slightly longer than wide (length/width female 1.05, male 1.01), its lateral margin with small, pointed extensions fitting in coxal concavities of legs. Chelicera without teeth on margins of fang furrow, fang very short. Legs with spines on femur, patella, tibia and metatarsus, metatarsi I–IV with ventral hair tufts in the apical part; upper claws of legs with 7–10 teeth.

Male palp (Figs. 2–5): Retrolateral apophysis of tibia digitiform, wide at the base, ventral one small (Fig. 3); median apophysis on tegulum large, its tip rostrated but not bent (Fig. 4), embolic division very thick (Fig. 2), embolus with wide tip, embolic apophysis developed (Fig. 5).

Opisthosoma oval (that of female deflated as in Fig. 6), longer than wide (length/width female 1.16, male 1.58). Posterior spinnerets much

shorter than anterior ones.

Female genitalia (Figs. 7–9): Opening part wide, epigynal plate constricted in the middle; spermathecae tightend and spiral, extending dorsad.

Coloration and markings (Figs. 1, 6). Female: Carapace blackish brown, cephalic part reddish brown, chelicera, palp, maxilla and sternum reddish brown, coxae of legs yellowish brown, other segments of legs brown. Opisthosoma dorsum blackish brown, with white spots; venter light yellowish brown, with a pair of longitudinal stripes in black. Male: Carapace completely blackish brown, chelicera, maxilla and sternum reddish brown, apical part of maxilla white, palp blackish brown, femora of legs blackish brown, other segments of legs yellowish brown. Opisthosoma dorsally dark grey, with a brown plate in the anterior part, and four white spots in the middle; ventrally light beige, with indistinct black stripes.

Distribution. Northern Vietnam (at present known only from the type locality).

Remark. This species is dedicated to Dr. Shuhei Nomura, Tokyo, Japan.

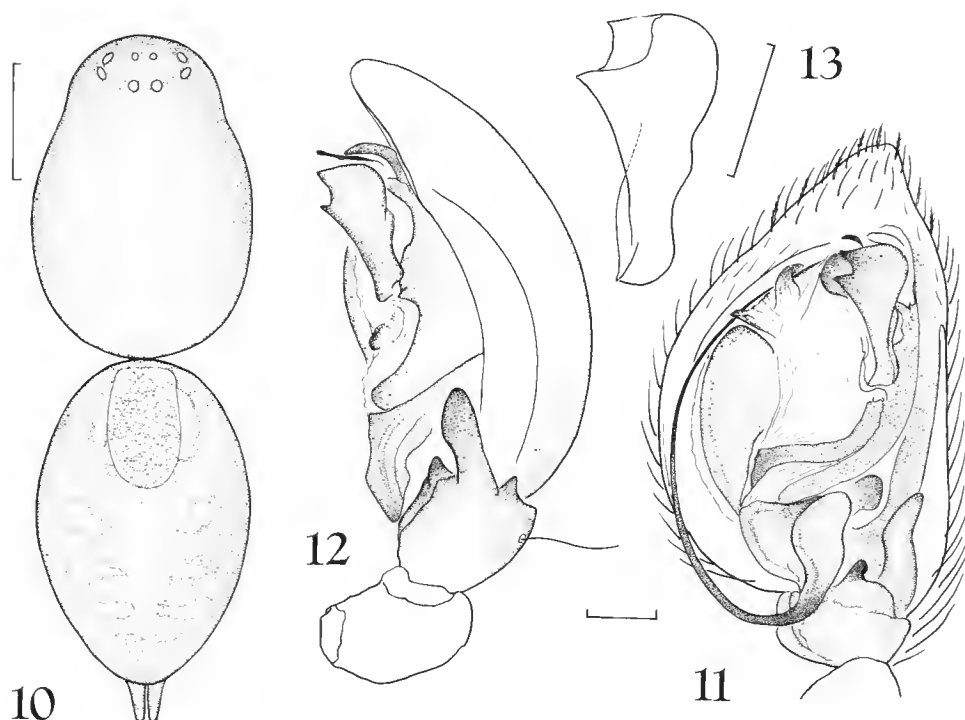
Mallinella vietnamensis sp. nov.

(Figs. 10–13)

Diagnosis. The median apophysis on tegulum of male palp of this new species bears some resemblance in shape to that of *Mallinella uncinata* (Ono, 1983) described from Kaski District, Central Nepal (ca. 1900 m in elevation) and *M. irrorata* (Thorell, 1895) from Palon, Burma (cf. Figs. 13 and Ono, 1983, Figs. 7, 9). However, these three species can be easily distinguished from one another by the shape of embolic division. The embolus of the new one is filiform and very thin.

Type specimens. Male holotype and one male paratype from Tam Dao, ca. 900 m in elevation, Vinh Phu Prov., northern Vietnam, 13-V-2003, S. Nomura leg. (IEBR and NSMT-Ar 5418-5419).

Other specimen examined. 1 subadult male with same data as for the holotype (NSMT-Ar



Figs. 10–13. *Mallinella vietnamensis* Ono, sp. nov., male holotype (NSMT-Ar 5418).—10, Pro- and opisthosomata, dorsal view; 11, palpal organ, ventral view; 12, palpal organ, retrolateral view; 13, median apophysis, ventral view. [Scales: 10, 1 mm; 11–13, 0.2 mm.]

5420).

Description (based on the male holotype; female unknown). Measurement: Body length 5.63 mm; prosoma length 2.81 mm, width 2.00 mm; opisthosoma length 2.74 mm, width 1.78 mm; lengths of legs [total length (femur+patella+tibia+metatarsus+tarsus)]: I 6.37 mm (1.78+0.74+1.33+1.26+1.26), II 5.87 mm (1.56+0.74+1.19+1.34+1.04), III 5.79 mm (1.56+0.67+1.11+1.41+1.04), IV 8.05 mm (2.00+0.78+1.56+2.30+1.41).

Prosoma. Carapace longer than wide (length/width 1.41), with a median furrow. Eyes: anterior eye row almost straight, posterior eye row procurved in dorsal view, $AME < ALE = PLE = PME$ (9:10 in size), $AME - AME < AME - ALE$ (1:2), $PME - PME$, $PME - PLE$ (2:5), clypeus very long, more than three times the width of median ocular area, median ocular area longer than wide (length/width 1.23), wider behind than in front (anterior width/posterior

width 0.85). Labium triangular, slightly wider than long (length/width 0.95), sternum haired, slightly longer than wide (length/width 1.04), its lateral margin with small, pointed extensions fitting in coxal concavities of legs. Chelicera without teeth on margins of fang furrow, fang very short. Legs with spines on femur, patella, tibia and metatarsus, metatarsi I–IV with ventral hair tufts in the apical part; upper claws of legs with 7–9 teeth.

Male palp (Figs. 11–13): Retrolateral apophysis of tibia large, digitiform, not widened at the base, ventral one with a papillar sclerotized tip (Figs. 11–12); median apophysis on tegulum narrower at the base, its tip bifid and strongly sclerotized (Fig. 13), embolic division very thin and not bifid, embolus filiform (Fig. 11).

Opisthosoma oval, longer than wide (length/width 1.54). Posterior spinnerets much shorter than anterior ones.

Coloration and markings (Fig. 10). Carapace

black, chelicera and sternum brown, maxilla light yellowish brown, palp black, coxae of legs yellowish white, femora black, other segments of legs grey. Opisthosoma dorsally dark grey, with a reddish brown plate and five pairs of white spots; ventrally grey, mottled with white.

Variation. Measurement of the paratype male: Body length 5.19 mm, prosoma length 2.74 mm, width 1.93 mm; opisthosoma length 2.52 mm, width 1.70 mm. The subadult male specimen has no sclerotized plate on the opisthosoma.

Distribution. Northern Vietnam (known only from the type locality).

Remark. Specific name is derived from the name of the country.

***Mallinella karubei* sp. nov.**

(Figs. 14–18)

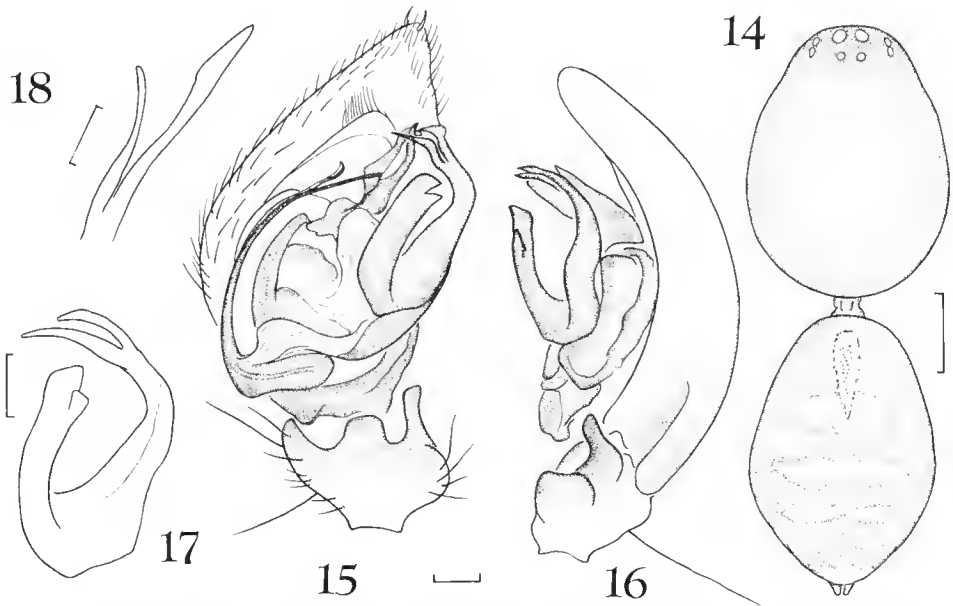
Diagnosis. The embolic division of the new species is similar in shape to those of some Nepalese species, *Mallinella martensi* and *M. uncinata*. However, this species is readily distin-

guished from all the other congeners from Asia by the unique shape of median apophysis on tegulum of male palp (Fig. 17). Besides, the new species has long and slender legs; the length of leg I is more than twice the body length.

Type specimen. Male holotype from Bach Ma National Park, ca. 1200 m in elevation, Thua Thien Huc, Central Vietnam, 7-V-2003, H. Karube and H. Ono leg. (IEBR and NSMT-Ar 5421).

Description (based on the male holotype; female unknown). Measurement: Body length 6.89 mm; prosoma length 3.48 mm, width 2.48 mm; opisthosoma length 3.11 mm, width 2.26 mm; lengths of legs [total length (femur+patella+tibia+metatarsus+tarsus)]: I 13.97 mm (3.30+1.04+3.37+3.89+2.37), II 11.71 mm (2.93+1.04+2.59+3.26+1.89), III 11.04 mm (2.89+1.04+2.37+3.11+1.63), IV 15.15 mm (3.55+1.04+3.26+4.52+2.78).

Prosoma. Carapace longer than wide (length/width 1.40), with a median furrow. Eyes: the anterior eye row recurved and the posterior one procurved in dorsal view, AME>ALE=



Figs. 14–18. *Mallinella karubei* Ono, sp. nov., male holotype (NSMT-Ar 5421).—14, Pro- and opisthosoma, dorsal view; 15, palpal organ, ventral view; 16, palpal organ, retrolateral view; 17, median apophysis, ventral view; 18, the distal part of embolic division, prolateral view. [Scales: 14, 1 mm; 15–18, 0.2 mm.]

PLE>PME (10:7:6:7 in size), AME-AME>AME-ALE (4:3), PME-PME, PME-PLE (7:10), clypeus long, but less than twice the width of median ocular area, median ocular area wider than long (length/width 0.91), wider in front than behind (anterior width/posterior width 1.22). Labium triangular, as long as wide, sternum haired, slightly longer than wide (length/width 1.07), its lateral margin with small, pointed extensions fitting in coxal concavities of legs. Chelicera without teeth on margins of fang furrow, fang very short. Legs slender and long, with spines on femur, patella, tibia and metatarsus, hair tuft present on ventroapical part of metatarsi II-IV, but absent on leg I; upper claws of legs with 6-7 teeth.

Male palp (Figs. 15-18): Retrolateral apophysis of tibia digitiform and curved, widened at the base, ventral one large and wide (Figs. 15-16); median apophysis on tegulum developed and unique in shape, its tip clearly bifid (Fig. 17), embolic division thin and bifid, embolus filiform (Figs. 15, 18).

Opisthosoma oval, longer than wide (length/width 1.38). Posterior spinnerets relatively long and slightly shorter than anterior ones.

Coloration and markings (Fig. 14). Carapace and chelicera blackish brown, maxilla yellowish brown, labium and sternum brown, palp light yellowish brown, coxae of legs light yellow, femora distally black, the other part of femora and other segments of legs light yellowish brown. Opisthosoma dorsally black, with an indistinct brown plate and five vertical bars in white; ventrally light yellowish brown, with three longitudinal black stripes.

Distribution. Central Vietnam (known only from the type locality).

Remark. Dedicated to Dr. Haruki Karube, Kanagawa, Japan.

***Mallinella thinhi* sp. nov.**

(Figs. 19-22)

Diagnosis. This new species resembles *Mallinella hingstoni* (Brignoli, 1982) from Tibet,

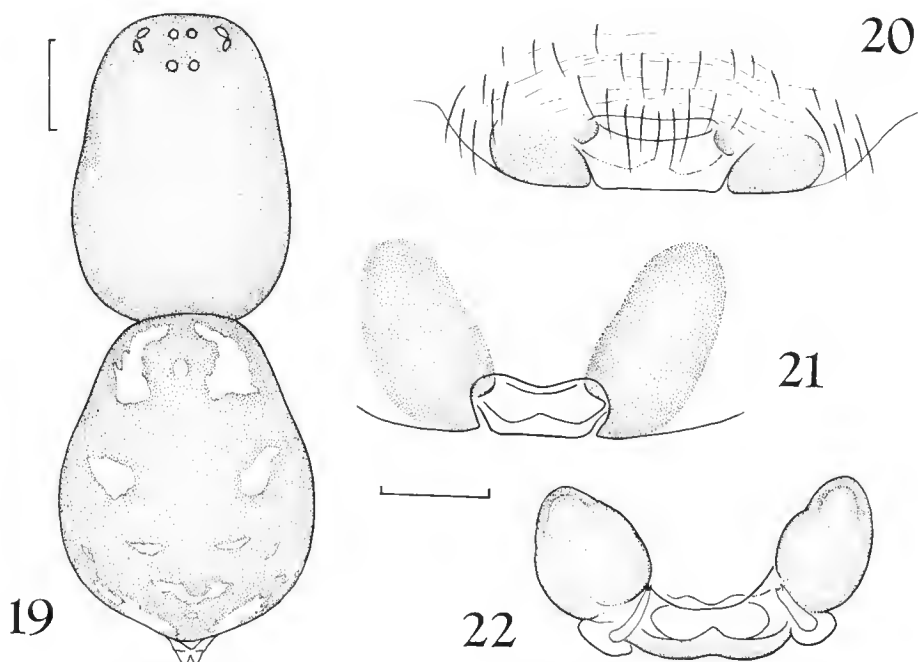
China and *M. shimojanai* (Ono et Tanikawa, 1990) from Iriomotejima Island, Japan in having globular spermathecae, but is distinguished from these species by the shape of epigynal plate (cf. Figs. 20 and Brignoli, 1982, fig. 2 and Ono & Tanikawa, 1990, Fig. 24). The plate of this new species is much thinner than those of the other two species.

Type specimen. Female holotype from Bach Ma National Park, 1200 m in elevation, Thua Thien Hue, Central Vietnam, 8-VI-2002, S. Nomura leg. (IEBR and NSMT-Ar 5422).

Other specimens examined. 1 juvenile female with the same data as for the holotype; 1 subadult female from Tri Sao near Bach Ma, ca. 400-500 m in elevation, Thua Thien Hue, Central Vietnam 9-VI-2002, H. Ono leg. (IEBR and NSMT-Ar 5423-5424).

Description (based on the female holotype; male unknown). Measurement: Body length 5.78 mm; prosoma length 3.00 mm, width 2.07 mm; opisthosoma length 2.96 mm, width 2.30 mm; lengths of legs [total length (femur+patella+tibia+metatarsus+tarsus)]: I 6.82 mm (1.89+0.82+1.48+1.48+1.15), II 6.03 mm (1.70+0.74+1.26+1.26+1.07), III 6.08 mm (1.63+0.74+1.26+1.41+1.04), IV 8.44 mm (2.15+0.74+1.74+2.33+1.48).

Prosoma. Carapace longer than wide (length/width 1.45), with a median furrow. Eyes: both the eye rows procurved in dorsal view, AME=PME<ALE=PLE (5:6 in size), AME-AME<AME-ALE (3:5), PME-PME<PME-PLE (4:9), clypeus long, more than twice the width of median ocular area, median ocular area longer than wide (length/width 1.21), wider behind than in front (anterior width/posterior width 0.86). Labium triangular, as long as wide, sternum haired, slightly longer than wide (length/width 1.02), its lateral margin with small, pointed extensions fitting in coxal concavities of legs. Chelicera without teeth on margins of fang furrow, fang very short. Legs with spines on femur, patella, tibia and metatarsus, hair tuft present on metatarsi I-IV; upper claws of legs with 8-10 teeth.



Figs. 19–22. *Mallinella thinhii* Ono, sp. nov., female holotype (NSMT-Ar 5422). —19, Pro- and opisthosoma, dorsal view; 20, epigynum, ventral view; 21, epigynum, cleared, ventral view; 22, female genitalia, dorsal view. [Scales: 19, 1 mm; 20–22, 0.2 mm.]

Opisthosoma pyriform, longer than wide (length/width 1.29). Posterior spinnerets shorter than anterior ones.

Female genitalia (Figs. 20–22): Opening part wide, epigynal plate thin, widened in the middle; spermathecae short and globular, extending anteriorly.

Coloration and markings (Fig. 19). Carapace blackish brown, lighter at the middle, chelicera reddish brown, maxilla yellow, labium and sternum brown, femur and patella of palp yellow, tibia and tarsus of palp reddish brown, coxae of legs yellow, femora distally blackish brown, the other part of femora and patellae yellowish brown, tibiae proximally blackish brown, distally yellowish brown, metatarsi and tarsi yellowish brown. Opisthosoma dorsally black, with white markings as in Fig. 19; ventrally purplish brown, mottled with white.

Distribution. Central Vietnam.

Remark. Dedicated to Dr. Ta Huy Thinh, Hanoi, Vietnam.

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